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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/602,814	11/20/2000	Masao Takeuchi	82493.0002	9608

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EXAMINER

KERNS, KEVIN P

ART UNIT	PAPER NUMBER
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1725

DATE MAILED: 02/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/602,814

Applicant(s)

TAKEUCHI ET AL.

Examiner

Kevin P. Kerns

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 January 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakemi et al. (US 5,890,283).

Sakemi et al. ('283) disclose an apparatus and method for mounting electrically conductive balls, the apparatus of which includes the following structures: a positioning mechanism, a ball supply device (with bottom area less than 80% coverage due to spherical packing), a ball transfer head, a spring (force energizing device), guide shafts (moving mechanism) for moving the ball transfer head in the x- and y-directions, a

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workpiece with associated positioning means, a vacuum unit to hold the conductive balls (in which the suction holes have bellows-shaped openings), an ultrasonic vibrator, and a flux/adhesive reservoir (abstract; column 1, lines 7-10 and 35-67; column 2, lines 1-10; column 3, lines 42-50; column 4, lines 1-10, 26-40, and 53-65; column 5, lines 13-30; column 6, lines 10-25; and Figures 1-8). The spring resiliently supports the head, and the head is lowered and raised appropriately for subsequent adhesion to flux or other adhesive (abstract; column 1, lines 52-67; column 2, lines 1-10; column 5, lines 30-48; and Figures 3-5). Pressing forces F1 and F2 are established for flux adhering and ball mounting steps, respectively (column 7, lines 19-26 and 66-67; and column 8, lines 1-30). One of ordinary skill in the art would have recognized that the use of a hammer rather than the ultrasonic vibrator would also result in dislodging of the conductive balls from the workpiece, as these dislodging means are well-known functional equivalents. With regard to the clamping means and process to hold the energized force applied by the spring, one of ordinary skill in the art would have readily used the pressing force controller 62, in cooperation with rod 39 and springs 40, as a clamping means with (potential energy) energized force, such that the pressing force controller is capable of applying a clamping force with subsequent releasing of the force, at desired values, for the purpose of controlling the force on the springs that attach to the mounting head (abstract; column 4, lines 22-40 and 53-65; column 5, lines 13-30; column 6, lines 10-25; and Figure 2). Regarding the range of force values, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re

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Aller, 105 USPQ 233. In this instance, the clamping force values are critical due to the fact that the solder balls would be inadequately clamped (not able to be transferred) with low force values, and would be damaged/crushed with high force values (rendering them unusable for semiconductor workpiece devices). In addition, one of ordinary skill in the art would have recognized that the structure of touch sensor 43 (rigid structure used for force measurement) functions as a rigid lower stop (rigid lower positioning stop 18 of application), which serves as a force generating device to store an energized force in combination with pressing force controller 62, rod 39, and springs 40, the combination of which is inherently operable to prevent vibration of the head (due to clamping with a sufficiently strong force) during movement of the head (column 4, lines 22-40 and 53-65; column 6, lines 10-25; and Figure 2).

4. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakazato (US 5,768,775).

Nakazato ('775) discloses a mounting apparatus and method of mounting conductive balls, in which the apparatus includes the following structures: a positioning mechanism, a ball supply device (with bottom area less than 80% coverage due to spherical packing), a ball transfer head, a spring (force energizing device), guide shafts (moving mechanism) for moving the ball transfer head in the x- and y-directions, a workpiece with associated positioning means, a vacuum unit to hold the conductive balls (in which the suction holes have bellows-shaped openings), an ultrasonic vibrator, and a flux/adhesive reservoir (abstract; column 1, lines 7-9 and 40-67; column 2, lines

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1-8 and 24-67; column 3, lines 1-67; column 4, lines 1-30; and Figures 1-3). The spring resiliently supports the head, and the head is lowered and raised appropriately for subsequent adhesion to flux or other adhesive (abstract; column 1, lines 46-56; column 2, lines 33-42 and 51-62; column 3, lines 35-42; and Figures 1-3). One of ordinary skill in the art would have recognized that the use of a hammer rather than the ultrasonic vibrator would also result in dislodging of the conductive balls from the workpiece, as these dislodging means are well-known functional equivalents. With regard to the clamping means and process to hold the energized force applied by the spring, one of ordinary skill in the art would have readily used the pressing force controller 62, in cooperation with rod 39 and springs 40, as a clamping means with (potential energy) energized force, such that the pressing force controller is capable of applying a clamping force with subsequent releasing of the force, at desired values, for the purpose of controlling the force on the springs that attach to the mounting head (abstract; column 2, lines 34-42 and 51-62; column 3, lines 6-17 and 65-67; column 4, lines 1-11; and Figure 2). Regarding the range of force values, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233. In this instance, the clamping force values are critical due to the fact that the solder balls would be inadequately clamped (not able to be transferred) with low force values, and would be damaged/crushed with high force values (rendering them unusable for semiconductor workpiece devices). In addition, one of ordinary skill in the art would have recognized that the structure of touch sensor 43 (rigid structure used for

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force measurement) functions as a rigid lower stop (rigid lower positioning stop 18 of application), which serves as a force generating device to store an energized force in combination with pressing force controller 62, rod 39, and springs 40, the combination of which is inherently operable to prevent vibration of the head (due to clamping with a sufficiently strong force) during movement of the head (column 2, lines 51-62; column 3, lines 6-17 and 65-67; column 4, lines 1-11; and Figure 2).

Response to Arguments

5. The examiner acknowledges the applicants' amendment received by the USPTO on January 5, 2005. The applicants' change to the title is approved. The applicants have cancelled claims 5-13 in the amendment. Claims 1-4 are currently under consideration in the application.

6. Applicants' arguments filed January 5, 2005 have been fully considered but they are not persuasive.

With regard to the applicants' arguments on pages 5 and 6 of the amendment, the examiner respectfully disagrees with the applicants' contention that both the Sakemi et al. and Nakazato references (see their respective Figure 2's), do not include any "clamping device" for "clamping said head". In Figure 2 of both references, such a "clamping device" for clamping the head structure is illustrated by reference numbers 39, 40, and 62 (see paragraphs 3 and 4 above, as well as the newly underlined portions of paragraphs 3 and 4, which address the amended portion of the applicants' claim 1.

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Both Figure 2's of the 35 USC 103(a) references appear to be substantially the same as the applicants' Figure 4, including the lower stop 18. The examiner agrees that this structure (lower stop 18) appears as reference number 43 (touch sensor) in the Sakemi et al. and Nakazato references. However, touch sensor 43 also serves as a rigid lower stop. Since the surface of a touch sensor does not deform or show otherwise elastic properties under load, such a sensor is inherently rigid. As a result, the touch sensor serving as a rigid lower stop would not "very likely break" as the applicants contend on page 5 of their remarks/arguments. With regard to the vibration issue, the applicants' ball mounting apparatus appears to be substantially similar to those of Sakemi et al. and Nakazato, and it is unclear which one (or more) of the x, y, or z axes of the prior art references would contain vibration, whereas the applicants' apparatus would prevent such vibration. The applicants are respectfully requested to distinguish a structural difference that would prevent vibration in one or more of the x, y, or z axes.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kevin P. Kerns whose telephone number is (571) 272-1178. The examiner can normally be reached on Monday-Friday from 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on (571) 272-1171. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kevin P. Kerns *Kevin Kerns* 2/11/05
Examiner
Art Unit 1725

KPK
kpk
February 11, 2005